

koneL

KAC-150A
REMOTE
ANTENNA COUPLER

OPERATION & SERVICE MANUAL

koneL corporation

271 Harbor Way, South San Francisco, California 94080



A NARCO Company

Printed in USA

WARRANTY

Konel equipment is guaranteed by the factory to be free from defects in components and workmanship for a period of at least one year from date of purchase.

For a period of 90 days from date of purchase, the equipment carries a free labor/service warranty provided such equipment is sent to the factory or service depot prepaid and is accepted by return freight collect.

Permission to return equipment must be obtained in advance from the factory through the Konel distributor or dealer from whom the equipment was purchased.

After examination at the factory, equipment will be repaired without charge if, in the opinion of the factory, defects are due to faulty components or workmanship and are not caused by tampering, abuse, or shipping damage.

This warranty may be invalid unless the warranty card packed with the equipment is returned to the factory within 15 days of installation of the equipment.

Note: the manufacturer reserves the right to make changes in specifications, designs, or prices without notice and without incurring any obligation to install changes on equipment previously sold.

konel corporation

SECTION 1

GENERAL DESCRIPTION

1.1 PURPOSE

The KONEL KAC-150A Remote Antenna Coupler is intended for use with transmitting equipment using as many as ten pre-tuned fixed channels and having an output power level of up to 100 watts average, or up to 150 watts peak envelope power into a nominal 50 ohm load.

1.2 DESCRIPTION

The KAC-150A contains an assortment of inductances and capacitors which may be connected in several configurations to match a wide variety of antennas to a nominal 50 ohm termination. The unit also includes a multi-section switch which is motor driven to any one of ten positions so that the correct circuit configuration is automatically made as the desired channel is selected.

Since the KAC-150A, in most installations, is located at the base or at one end of the antenna system, the unit is housed in a weather-resistant box for outside mounting. The Coupler is physically small and light in weight to permit mast-top installations. Electrical connections to the unit are made through a multi-lead control cable and a length of coaxial cable.

The KAC-150A, when properly installed and adjusted, permits transceiver operation with antennas between 16 and 75 feet in length over the frequency range 1.6 - 22 MHz.

1.3 EQUIPMENT SUPPLIED

The KAC-150A Remote Antenna Coupler consists of the following equipment:

- 1 KAC-150A Remote Antenna Coupler
- 1 Control cable 30 feet in length with 12 pin connector plug (Other length cables available on special order)
- 1 KAC-150A Instruction Manual

1.4 EQUIPMENT NOT SUPPLIED

The KAC-150A requires a length of 50-ohm coaxial cable for the radio-frequency connection to the transceiver. This cable is not supplied with the unit. Type RG-58/U cable can be used if the total cable length does not exceed 20 feet. If the cable exceeds 20 feet in length, type RG-8/U cable should be used. The cable should be terminated with a type PL-259 connector at each end.

SECTION II

INSTALLATION

2.1 UNPACKING AND INSPECTION

Remove all packing material and carefully lift unit from its box. Check the equipment for completeness of order. If damage exists, save packing material and containers to substantiate claim with transportation company.

2.2 INSTALLING ANTENNA COUPLER

The KAC-150A is supplied with a heavy aluminum channel for mounting either to a flat surface or to the ship's mast. Hardware for mounting will vary with each installation but in general, heavy lag-bolts are used when mounting to wood surfaces, while machine screws and nuts must be used when mounting onto metal or fiberglass surfaces. For mast mounting, stainless steel clamps or "U" bolts should be used. The use of stainless hardware is strongly recommended.

The unit is intended for mounting with the mounting channel in the vertical plane and with the coaxial connector downward. This allows routing the coaxial cable and the control cable to the bottom of the unit, thus preventing water from running into the housing. If the unit is installed in an enclosed area such that it is protected from the weather, the unit may be mounted in any plane. The remote control motor assembly is designed to operate correctly in any mounting plane.

A heavy ground strap connection must be run from Coupler housing to ship's ground. Do not depend on the coaxial cable to provide this ground.

Connections between the control cable are as follows:

<u>TERM. NO.</u>	<u>WIRE COLOR</u>
1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White
10	Black
11	Tan
12	Pink

Connection to the antenna is made through an insulator plate on the bottom surface of the Coupler. The connecting lead should be of high-tension cable with a drip loop fashioned where the lead enters the enclosure.

2.1 GENERAL

The design of the antenna and its supporting structure is the subject of this section. The antenna is a simple dipole of length 100 feet, supported by a tower of 100 feet. The antenna is made of 1/2 inch diameter wire. The supporting structure is made of 2 inch diameter pipe. The antenna is supported by a tower of 100 feet. The antenna is made of 1/2 inch diameter wire. The supporting structure is made of 2 inch diameter pipe. The antenna is supported by a tower of 100 feet. The antenna is made of 1/2 inch diameter wire. The supporting structure is made of 2 inch diameter pipe.

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2.2 TOWER DESIGN

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2.3 WINDING PROVISIONS

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SECTION III

TUNING PRODEDURE

3.1 GENERAL

The circuit configuration and approximate settings of the various adjustable components in the Coupler may be made prior to mounting the coupler. Charts showing the approximate settings for various antenna lengths are given below and should be referred to when pre-tuning. Since each installation will vary somewhat due to the presence of surrounding metal, ground length, etc, exact settings cannot be made except after the unit is installed in its final operating position.

Small trimmer inductors are provided as a part of Channels 5 through 10. These trimmers are most effective in adjusting the coupler at the higher frequencies and for this reason Channels 5-10 should be reserved for the highest frequencies to be used. If for some reason this is not feasible, the control cable wiring to connector TB-1 should be rearranged as necessary so that the high-frequency channels are provided with trimmer inductors. The trimmers are not effective at frequencies below 12 MHz.

An unconnected switch wafer is provided in the Coupler and may be used to insert a series capacitor on one or more channels if required. See Section IV of this manual for recommendations for the use of series capacitors.

3.2 TUNING SET-UP

After the Coupler has been adjusted for the correct circuit configuration and with circuit values given in the charts in this section, install the coupler according to instructions in Section II of this manual. Insert a Reflected Power Meter in the coaxial line connecting the transmitter to the Coupler and an R-F ammeter in the antenna lead. The meters should be located as close to the coupler as possible since they will serve as a tuning indicator for final adjustments to the Coupler. If the Coupler is used with a Konel single-sideband transmitter, place the TUNE-OPERATE switch on transmitter in TUNE position. This permits keying of the transmitter by the keying switch (S2) in the Coupler. The TUNE-OPERATE switch also programs the transmitter to deliver a CW carrier output.

3.3 TUNING PROCEDURE

Keying the transmitter on with S2 will produce some indication on the reflected power meter. Adjust the input tuning capacitor for best antenna current indication. If a peak is not reached, adjust the coil tap on L1 until a definite peak in forward power is obtained when the input capacitor is adjusted. Alternately adjust L1 and the input capacitor until best forward power is obtained with minimum reflected power. In some cases, due to variations in the individual antenna installation, it may be necessary to omit or change the value of the output capacitor to obtain an acceptable reading on the power meter.

A reflected power reading of zero indicates that a resistive load of exactly 52 ohms is being presented to the transmitter. After this reading had been obtained, switching the power meter to FORWARD will indicate the actual power being delivered to the antenna coupler. In general, a reflected power reading of exactly zero is not essential to good operation. If the reflected power does not exceed 5% of the forward power reading, correct operation of the coupler can be assumed.

The tuning procedure is repeated for all channels to be used. After all channels have been tuned, it is good practice to re-check to see that none have been disturbed. Remove the RF ammeter. Finally, remove the reflected power meter from the transmitter coaxial cable and re-install the cable. Make certain that the keying switch (S2) is left in OFF position before securing the outer cover on the Coupler.

PRELIMINARY SETTINGS KAC-150A COUPLER

16 FOOT WHIP

Freq. (MHz)	2.1	2.4	4.1	8.3	12.4	16.5
Input Cap. P/N	*0809-04	*0809-04	*0809-04	0804	NONE	NONE
L1 Turns not shorted	22	27	8	5	4	3
Output Cap.	400	200	400	NONE	50	50

22 FOOT WHIP

Freq. (MHz)	2.1	2.4	4.1	8.3	12.4	16.5
Input Cap. P/N	*0809-04	*0809-04	0809-04	0804	NONE	NONE
L1 Turns not shorted	21	20	9	1	5	4
Output Cap.	400	300	300	NONE	50	50

50 FOOT LONG WIRE

Freq. (MHz)	2.1	2.4	4.1	8.3	12.4	16.5
Input Cap. P/N	*0809-04	0809-04	0807	0804	NONE	0804
L1 Turns not shorted	33	28	8	11	4	4
Output Cap.	100	100	NONE	50	50	50

* Connect 2000 pf Silver mica capacitor in parallel with trimmer capacitor specified.

SECTION IV

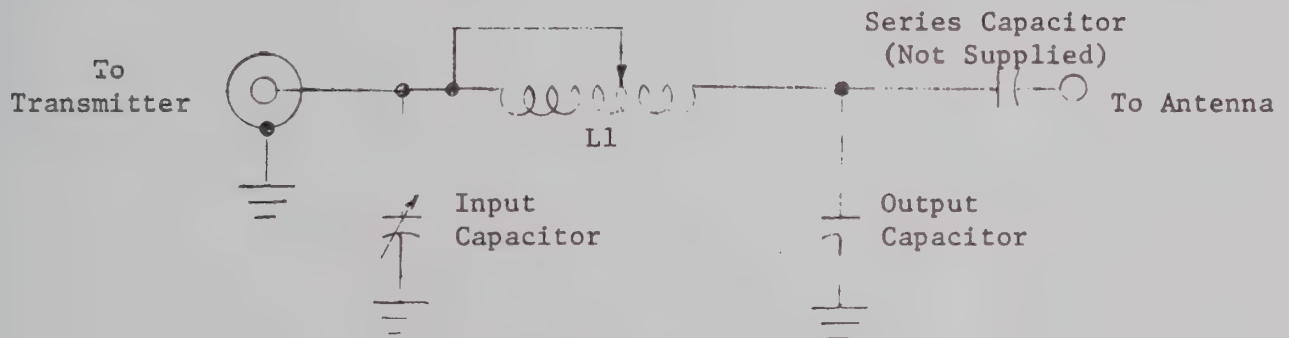
THEORY OF OPERATION

4.1 GENERAL

The Konel KAC-150A Remote Antenna Coupler consists of a modified "L" network which transforms the wide range of possible antenna impedances to the 52 ohm resistive impedance required by the transmitter. The basic circuit of the Coupler is shown in figure 4.1.

With some antenna configurations, it is necessary to alter the effective antenna impedance to bring it within the tuning capabilities of the "L" network. This is accomplished by adding a fixed capacitor across the antenna terminal. The value of the capacitor, of course, varies considerably depending upon the particular frequency used and the dimensions of the antenna. In many cases, no capacitor is required and in any case the actual value is not critical.

Occasionally, an antenna will be found that cannot be matched by the coupler at a given frequency. Quite often, this situation can be remedied by the addition of a series capacitor in the antenna lead-in. Since the radio-frequency voltage across the capacitor can be quite high, the capacitor must be of good quality and at least 2500 volt rating. This procedure is not recommended, however, and should this situation be encountered, the antenna dimensions should be altered slightly to avoid the use of the series capacitor.



BASIC CIRCUIT DIAGRAM
Fig. 4-1

4.2 CONTROL SYSTEM

Referring to the schematic diagram, the Coupler remote control system consists of drive motor B1, relay K1 and switch segment S1-E. The drive motor operates from 10-15 volts DC which is normally supplied from the transmitter and appears on a selected position of S1-E. This voltage closes relay K1 and is also applied through diode CR1 to the motor. The drive motor then turns the switch assembly until the correct channel is reached. At this time, DC power is removed from the circuit and the relay is de-energized. Contacts on the relay apply a short circuit across the motor to provide braking action which ensures

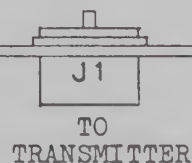
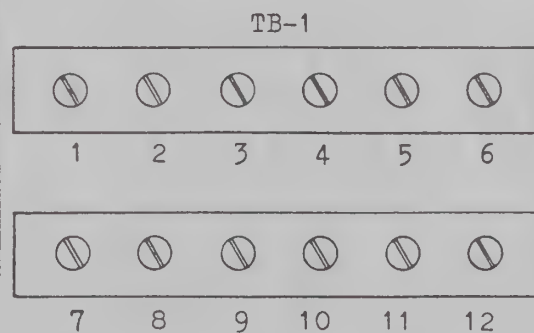
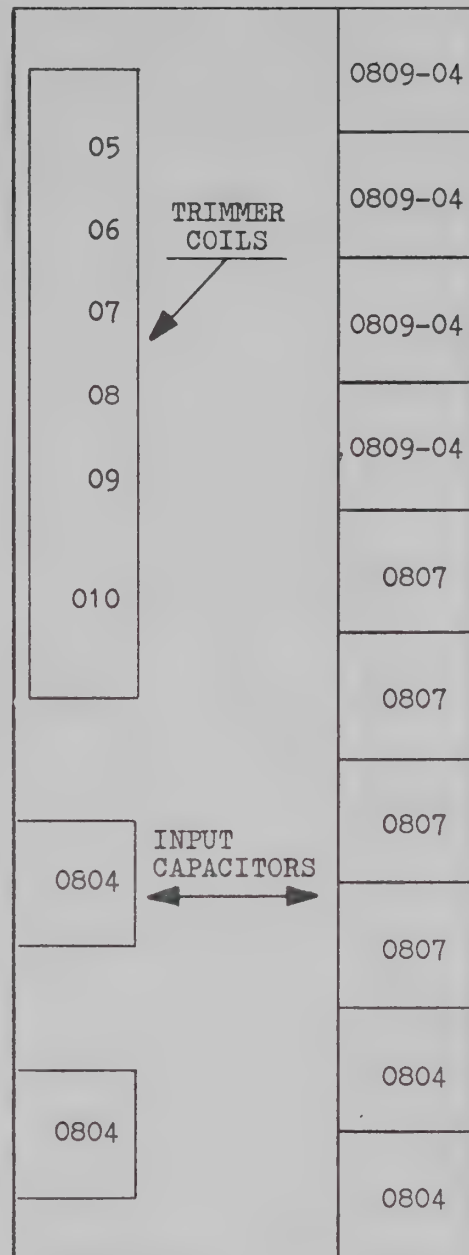
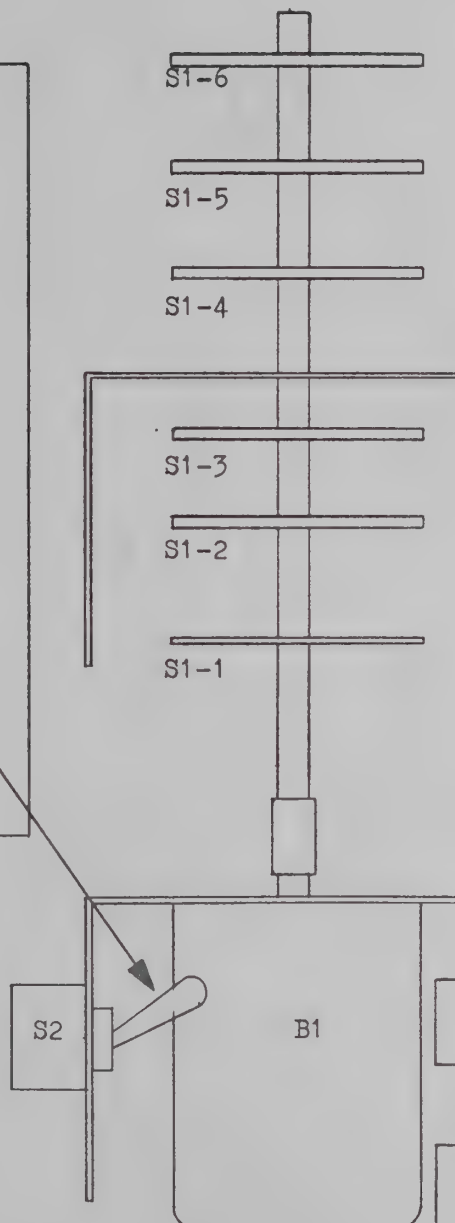
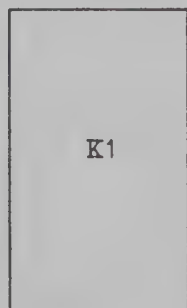
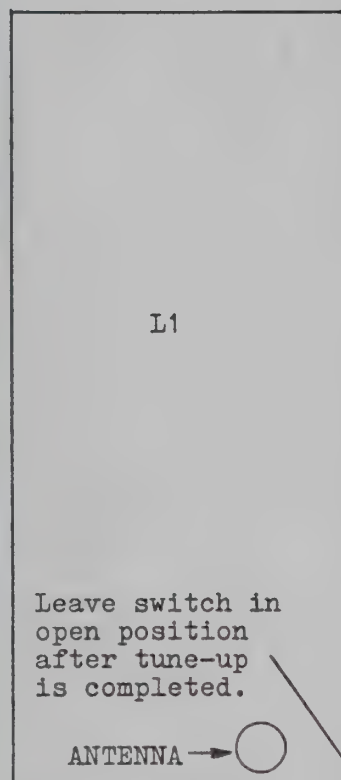
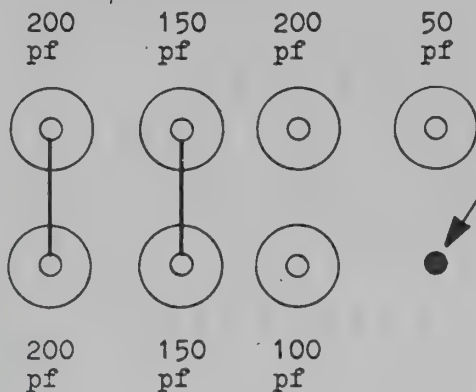
the motor stopping at the desired position. Diode CR1 prevents counter EMF from the motor from holding the relay closed after DC power has been removed. An additional contact on the relay prevents the transmitter from being keyed during the channel-change cycle.

KAC-150A PARTS LIST

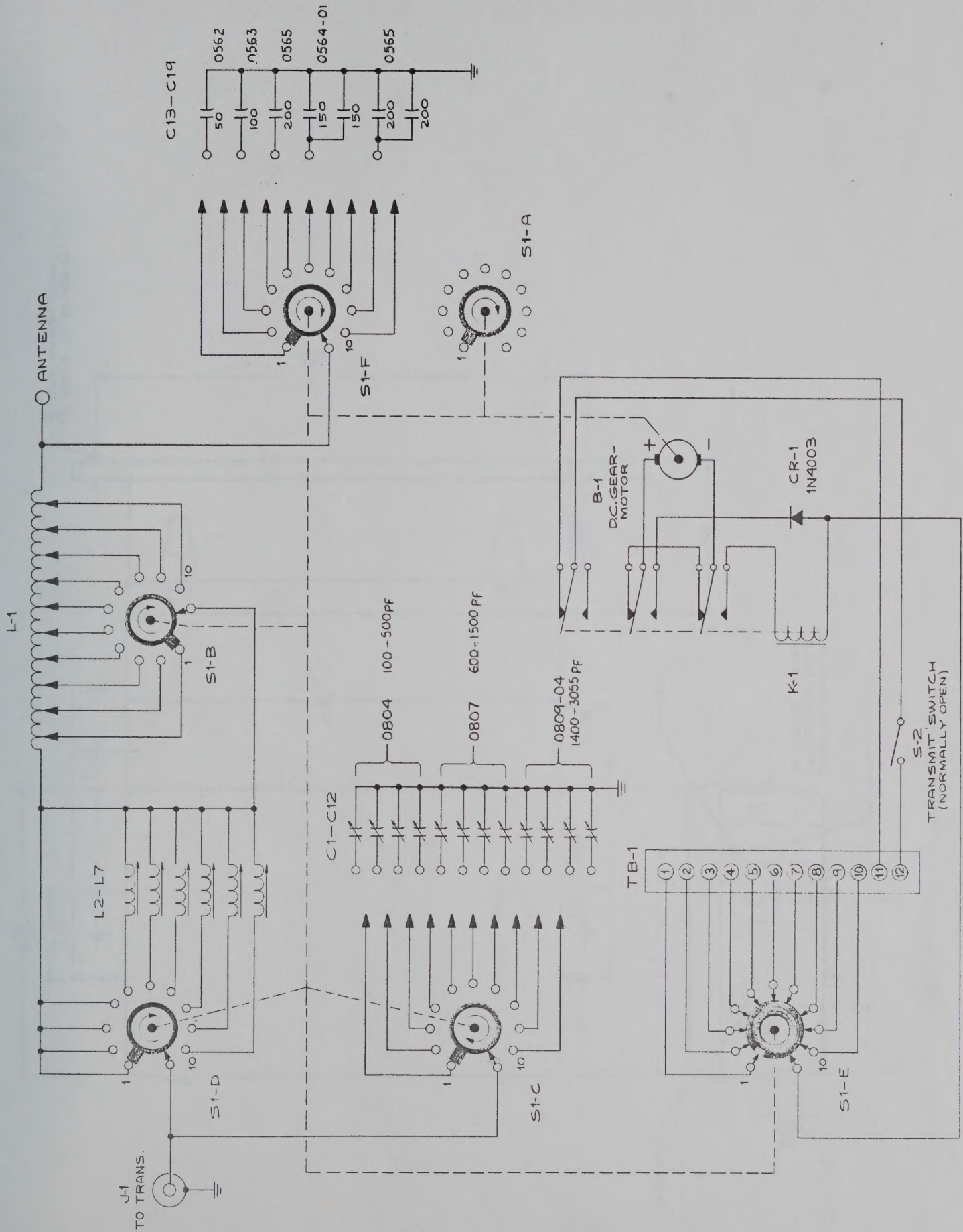
<u>Symbol</u>	<u>Description</u>	<u>Konel No.</u>
CHASSIS		
C13	Capacitor 50 MMF Cartwheel 7.5KV	0562
C14	Capacitor 100 MMF Cartwheel 5KV	0563
C16/17	Capacitor 150 MMF Cartwheel 5KV	0564-01
C15/18/19	Capacitor 200 MMF Cartwheel 5KV	0565
L1	Coil	1064
B1	Gearmotor 12V 10RPM Byom-3222	1307-05
S1-C/D	Switch 1 Pole 11 Pos. Ceramic Wafer	1465
S1-E	Switch 1 Pole 11 Pos. Bakelite Wafer	
	All Shorted But One	1466-01
S1-A/B/F	Switch 1 Pole 11 Pos. Ceramic Wafer	1467
K-1	Relay 3PDT	1511-04
CR-1	Diode	1N4003
P603	Plug 12 Pin Amphenol 86CP12	2385
	Coupling	2542-10
	Cable 12 Conductor Control	2991-05
ANTENNA COUPLER P.C. BOARD ASS'Y.		4274-010
C1/2/3/4	Trimmer 100-500 PF Arco	0804
C5/6/7/8	Trimmer 600-1500 PF Arco	0807
C9/10/11/12	Trimmer 1400-3055 PF Arco	0809-04
L2/3/4/5/6/7	Consisting of:	
	Coil	1055-02A
	Core	1090-19
	Clip	1090-20
	Form	1090-21
	P.C. Bd.	A-7108

OUTPUT CAPACITORS

SECURE UNUSED WIRE TO THIS INSULATOR



ANTENNA COUPLER, KAC-150A



ANTENNA COUPLER, KAC-150A

